

**THE HOUSE
OF
SILENCE**

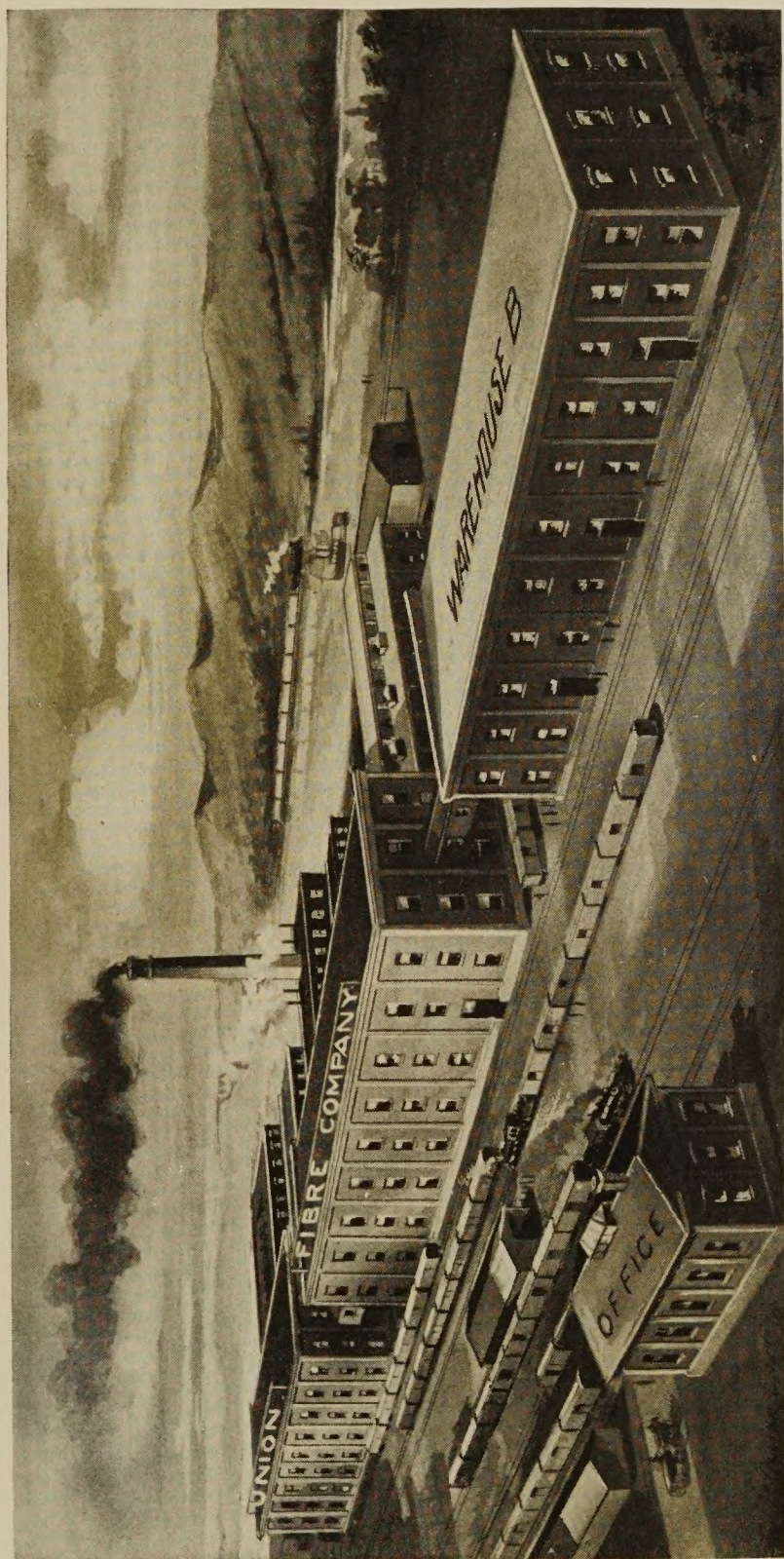


LINOFELT { **NOISE**
KEEPS OUT { **HEAT**
COLD

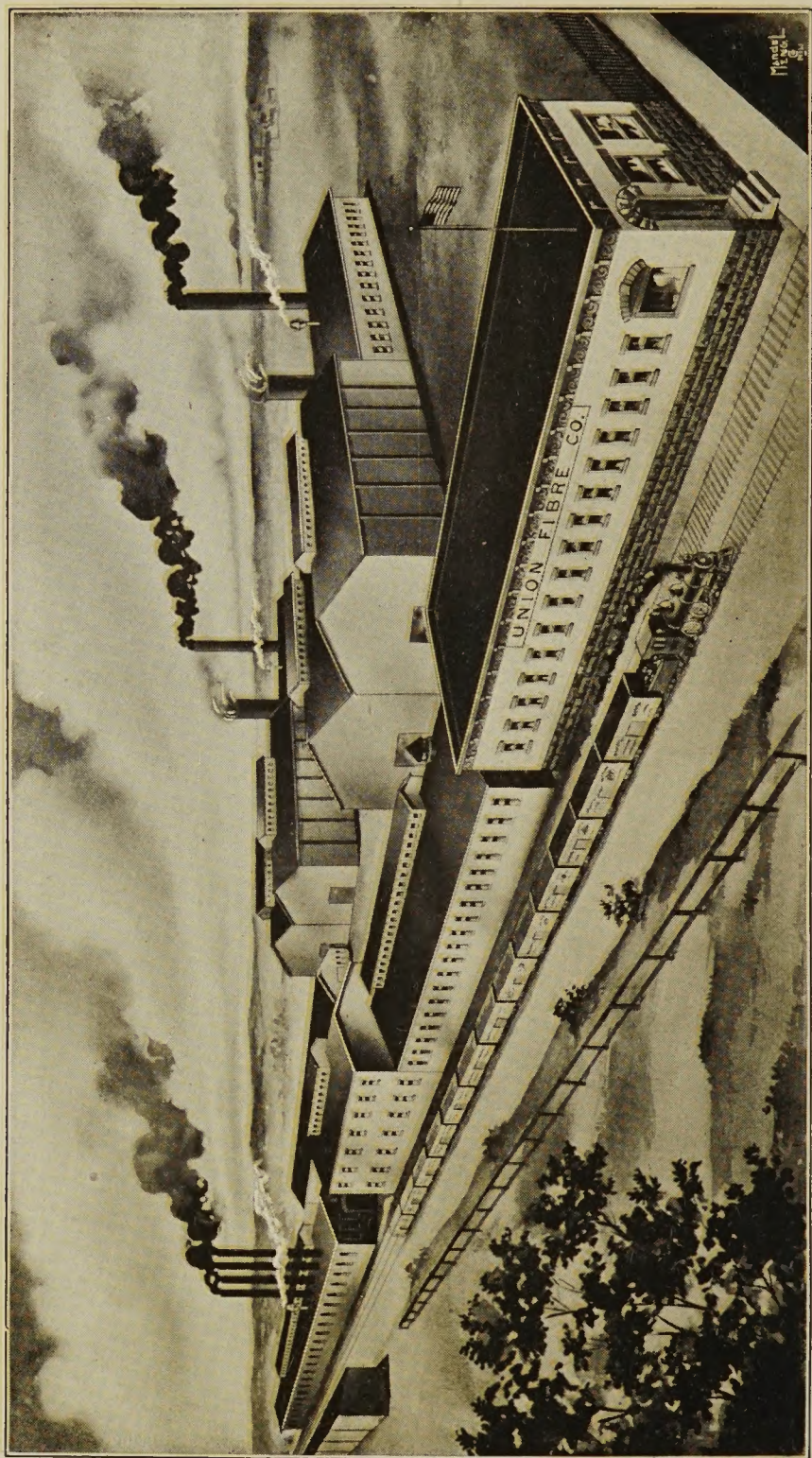
UNION FIBRE COMPANY

WINONA

MINNESOTA



NEW FIRE-PROOF PLANTS OF UNION FIBRE CO., WINONA, MINN.



ROCK WOOL AND LITH PLANT OF UNION FIBRE CO. AT YORKTOWN, INDIANA.

THIS IS THE BOOKLET
CALLED

THE HOUSE OF SILENCE

TREATING OF

“LINO FELT”

THE LINEN HOUSE
SHEATHING,
WHEREIN ARE SET
DOWN THE MODERN
SCIENTIFIC THEORIES
OF HEAT, (ALSO COLD)
AND SOUND, AND THE
REASONS WHY LINO-
FELT IS A NON-CON-
DUCTOR OF HEAT
WAVES AND SOUND
WAVES.



PUBLISHED FOR THE
DISCERNING PERSON

by the UNION FIBRE COMPANY

Factories WINONA, MINNESOTA
YORKTOWN, INDIANA

SOLD BY DEALERS IN BUILDING MATERIAL
AGENTS EVERYWHERE

1908

Wrap your houses in fine linen! as did those
wise persons whose houses are pictured herein.

THE HOUSE OF SILENCE

is the modern dwelling, protected from heat and cold by LINO-
FELT and made silent by
LINO FELT.



LINOFELT



INO FELT is a flax fibre insulating quilt for building purposes. Many tests show that it has the effectiveness of 38 thicknesses of ordinary standard building paper *for keeping out cold and sound.

It is manufactured by modern methods in large volume, and is sold by dealers in building material in all parts of the United States and Canada for dwellings of all kinds. Its uses today are so manifold that only a few of these can be referred to here, but new uses of this modern product are still arising and it is more than probable that in a few years it will be in practically universal use in all buildings intended for human occupancy

The purpose of this little book is to explain what Linofelt is for; to tell how it is made; to give some brief exposition of the theories of the transmission of sound and the conduction of heat, according to recognized scientific authorities; to give the experience of those who have bought and used Linofelt since it has been placed upon the market.

The cost of Linofelt is so low that it should be employed in the construction of every house above the crudest form of habitation. It adds less than 1 per cent to the cost on the average. It is safe to say that it makes any house 40 per cent warmer than when the ordinary building paper and back plaster are used; so that in the colder states the saving on fuel alone, not to speak of greater comfort, more than compensates for the cost.

Linofelt is not an expense; it is a money saver—a modern building necessity.

Linofelt is manufactured in several grades, according to the uses required, and at corresponding prices:

*Red rosin sized building paper 40 lbs. to 1,000 square feet was used in the tests.

REGULAR STOCK GRADES

RETTED LINOVELT (NO. 1)

This grade is manufactured from degummed flax fibre a quarter of an inch thick stitched between two sheets of rosin-sized paper, 36 inches wide, put up in rolls of 200 square feet, weight per roll 45 pounds. It is used for sound deadening and sheathing purposes in all classes of buildings.

NATURAL LINOVELT (NO. 2)

This grade is manufactured from thoroughly dried and hackled flax fibre three-sixteenths of an inch thick stitched between two sheets of rosin sized paper, 36 inches wide, put up in rolls of 200 square feet, weight per roll 45 pounds; used for sound deadening and sheathing purposes.

FROST PROOF LINOVELT

(Substitute for back plaster)

This grade is manufactured from degummed flax fibre a quarter of an inch thick, 14 inches wide, stitched between two sheets of rosin-sized paper 18 inches wide to fit between studding with 16 inch centers, put up in rolls of 100 lineal feet, weight per roll 30 pounds. It is also made regularly to fit between studding with 24 inch centers, and in other widths at a slightly increased cost. All rolls are 100 feet in length, but contain square feet in proportion to their width.

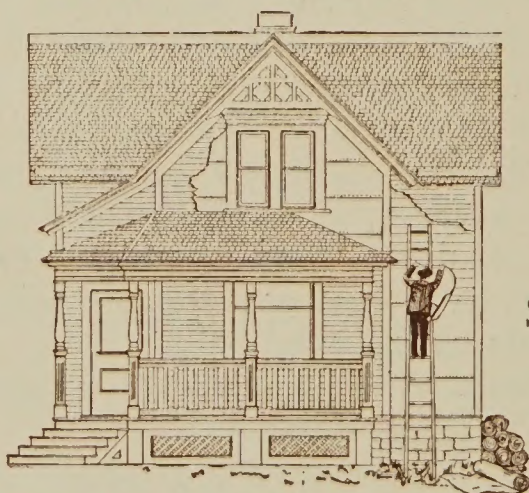
Full descriptions of the special grades and thicknesses, are given on pages 18 and 19

Our Linofelt Sheathing Will Keep Your House

Warm

in

Winter



Cool

in

Summer

This illustration serves the double purpose of showing how easily Linofelt is put on over the board sheathing, and how the siding or weather-board goes on after the Linofelt is in place.

PROTECTED FROM NOISE AND COLD BY LINOFEELT.



APARTMENT BUILDING, 12th St. and Paseo, Kansas City, Mo.
Owner, Austin Realty & Agency Co. Architect, Edwards and Sunderland.

RETTEO LINOFEELT

Retteo Linofelt, the scientific non-conductor of heat and sound, is a quilt of flax fibres, (unbleached linen threads). The first steps in its manufacture are like those used in linen-making.

As is generally known nearly every plant contains gums, oils and woody portions. Around these in the flax plant is a sheathing of the finest fibre—so fine that it compares with the finest silks. The retting process used in the olden times was in fact rotting the gums, oils and woody parts so that they were loosened from the fibre, which remains unaffected in the process.

Our flax straw is hackled and retted by our patent processes, by which it is freed from the vegetable gums and oils. It is picked and combed, by appropriate machines, then it is felted, also by a machine, into a blanket of uniform thickness and cut to desired widths.

When it is ready for the final process the fibre is the same, (save that it is unbleached) as that used in Ireland and Belgium in the manufacture of linen.

PROTECTED FROM NOISE AND COLD BY LINOFEEL.



Four Cottages, 5th and Olmstead Streets. Owner, C. H. BEYERSTEDT—
Contractor, John Knopp; Architect, A. E. Myhre. Winona, Minn..

The final step is to stitch, between two sheets of building paper (or water-proof paper or asbestos paper according to grade and quality), the flax fibre and complete the quilt.

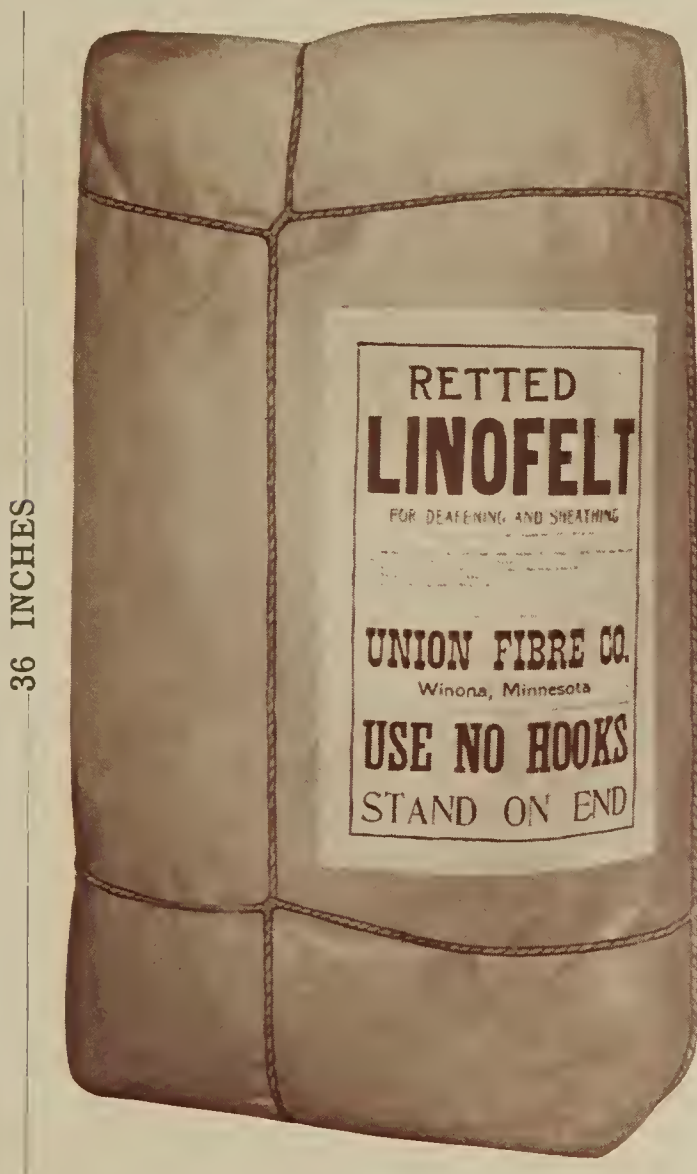
As it comes from the machines which make it into a quilt, the appearance of the Linofelt roll is shown as follows:



LINOFEEL ADDS LESS THAN 1 PER CENT TO THE COST of your house when you are building, but MORE THAN 40 PER CENT TO ITS COMFORT AND VALUE when you are living therein.

Every roll of Retted Linofelt contains 200 square feet (by actual measurement). It is uniformly 36 inches wide, quilted by five seams running longitudinally, and is one-quarter inch in thickness of flax fibre not counting the thickness of the paper. The weight of each roll is 45 pounds.

Then it is wrapped and labeled ready for shipment.



A PACKAGE OF LINOFEELT—200 Square Feet

LINOFEELT ADDS LESS THAN 1 PER CENT TO THE COST of your house when you are building, but MORE THAN 40 PER CENT TO ITS COMFORT AND VALUE when you are living therein.

PROTECTED FROM NOISE AND COLD BY LINO FELT.



RESIDENCE OF MR. A. J. COLLINS, Des Moines, Iowa

Des Moines, Iowa, Nov. 22, 1906.

UNION FIBRE CO., Winona, Minn.

Gentlemen:—Replying to yours of recent date, regarding the Linofelt I used, will say, that I consider the money that I spent for the Linofelt the best investment I made. Our house is free from draughts, and this summer our walls never became heated, like our old house that just had common building paper between the sheathing and siding.

We save the price of the Linofelt each year in coal.

Yours truly,

A. J. COLLINS.

Ives Grove, Wis., Jan. 28, 1907.

UNION FIBRE CO., Winona, Minn.

Gentlemen:—I have your letter of recent date, inquiring as to results obtained from your Retted and Frost Proof Linofelt, and in reply will say that we have used this for three winters in the house and for two winters in the barn. Our two large rooms are 44'x18', 9½' high, and we have only used one large base-burner stove, and in the coldest days we have had (being 28 degrees below zero) the further end of the room was never colder than 58 degrees.

In the barn, which is 62'x38', with cement floor and an eight inch air space, we have also used this material, and find that the barn is never colder than 38 to 40 degrees above, with the cattle and horses therein. In this barn we have

King's system of in and out ventilation, so that the barn is absolutely odorless.

I would recommend your materials to everyone wishing a warm building of any kind. I am now going to erect an ice house for farm purposes, and also a home creamery, and will use your materials throughout.

Very respectfully yours,

C. O. OLSON.

NATURAL LINO FELT

Natural Linofelt is used for house sheathing ("the modern successor to building paper") and sound deadening, in the same manner as Retted Linofelt.

It differs from the Retted Linofelt in that the vegetable gums are not removed by chemical process, and, therefore, the Natural Linofelt or No. 2 is slightly less efficient as a non-conductor of heat, cold and sound, than the Retted or first grade.

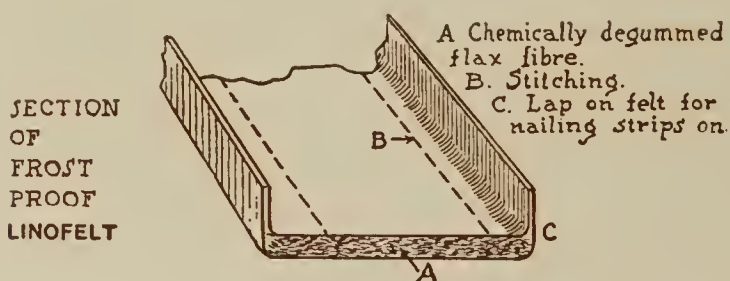
As compared with Retted Linofelt it has an efficiency of about 80 per cent. But still, as compared with any other sheathing and sound deadening materials it has an efficiency greater than any on the market.



LINO FELT ADDS LESS THAN 1 PER CENT TO THE COST of your house when you are building, but MORE THAN 40 PER CENT TO ITS COMFORT AND VALUE when you are living therein.

FROST PROOF LINO FELT

This is used as a substitute for back plaster, and as an additional barrier to the passage of heat and cold through the walls. It is placed between the studding, and fastened to them midway, dividing the four inch space between the lath and the outside boards into two 2-inch air spaces.



We have called this Frost Proof Linofelt to distinguish it from the Sheathing Linofelt. It is just the same as Retted Linofelt except that the degummed flax fibre is 14 inches wide and the paper covering it is 18 inches wide. This is for the variety designed for 16 inch studding, for other widths the fibre is, of course, wider. This permits the double paper to extend beyond the edge of the fibre two inches on each side. When you push the material into place between the studding, the fibrous part of the felt fits snugly at each side, and the extending edges of the paper lie against the side of the studding and are fastened by nailing a lath over them. See page 16.



PROTECTED FROM NOISE AND COLD BY LINOVELT
LITH AND MINERAL WOOL SOUND DEADENER



SORRENTO APARTMENTS. 430 Kane Place, Milwaukee, Wis.
Owner, H. Nunnemacher Architects, Hood and Tulgren.

Much Cheaper Than Back Plaster

In addition to the efficiency of Frost Proof Linofelt, as compared with back plaster, is its ease of application. It is put up in rolls of the proper dimensions, and, as will be seen, (Page 16) is very easily applied, and the necessity of temporarily heating your building to dry out back plaster is obviated.

When desired, we can furnish Frost Proof Linofelt for 24-inch centers, and other widths to order at a slightly increased cost.

LINOVELT ADDS LESS THAN 1 PER CENT TO THE COST of your house when you are building, but MORE THAN 40 PER CENT TO ITS COMFORT AND VALUE when you are living therein.

HOW TO BUILD WITH LINO FELT



THE usual practice is to build frame houses of 2x4, 2x6, or 2x8 studding, depending on the height of wall and strength required, and to set the studding at 16 inch centers or 24 inch centers. On the outside apply No. 2 tongued and grooved boards, or cheap quality rough boards, as sheathing. You can use a cheaper grade of sheathing boards if you use Linofelt.

Next apply a layer of Linofelt directly on the sheathing boards; use Linofelt nails or shingle nails driven through small pieces of cardboard or washers, so that the nail-heads may not cut through the paper of the Linofelt. This is for temporary fastening. Over the Linofelt, on top of each stud, nail lath and apply clapboard on these lath, nailing through to studding.

These lath over the studding are the permanent fastening of the Linofelt. This method of erection prevents the clapboards from compressing the Linofelt—reducing its efficiency by flattening out the air spaces.

The edges of the Linofelt should be butted together and not lapped.

These directions are very important to bring about good results.

The builder must remember to figure an allowance on width of door and window casings of seven-sixteenths of an inch for this thickness of Linofelt and its lath fastening on the outside wall of the house.

Frost Proof Linofelt (substitute for back plaster) is applied between the studding on the inside in the manner shown in the illustration on page 16. Then finish with lath and plaster, plaster board, or any inside finish desired, taking care to fill spaces around the windows and door frames with Linofelt Tape (See page 19) or pack them with odd pieces of degummed flax fibre.

THE ROOF—The natural tendency of cold is to descend, and heat to rise. For this reason the proper protection in your roof is even of greater importance than in the sides of your house.

To prevent waste of heat and render your attic warm in winter and cool in summer, put Frost Proof Linofelt between the rafters, fastening it with a lath each side and also fastening it to the roof boards with a lath down the middle.

If you do not care to provide a warm attic, Frost Proof Linofelt may be laid between the joists under the attic floor. This will be effective in keeping the heat in the rooms below, but, of course, will not make the attic warm.

The above description calls for both kinds of Linofelt—Sheathing Linofelt under the clapboards and Frost Proof Linofelt between the studding. This is the ideal construction to produce the very best results, but one thickness of Linofelt, either the Sheathing (Retted or Natural) or Frost Proof variety will give excellent satisfaction.

CUT LINO FELT with large tailors' shears or better with a sharp butcher knife. Make a slot with two boards, spread the Linofelt over the slot, and resting the knife in the slot draw it through the Linofelt.

Linofelt in Other Structures

BARNs

The care of live stock during the winter months is a problem to which every farmer should give careful attention.

It is particularly important that the barn should be so built as to keep out drafts; nothing will so quickly cause cows to run down as drafty quarters. The loss in milk supply frequently would amount to more than it would have cost to have made the barn comfortable and warm.

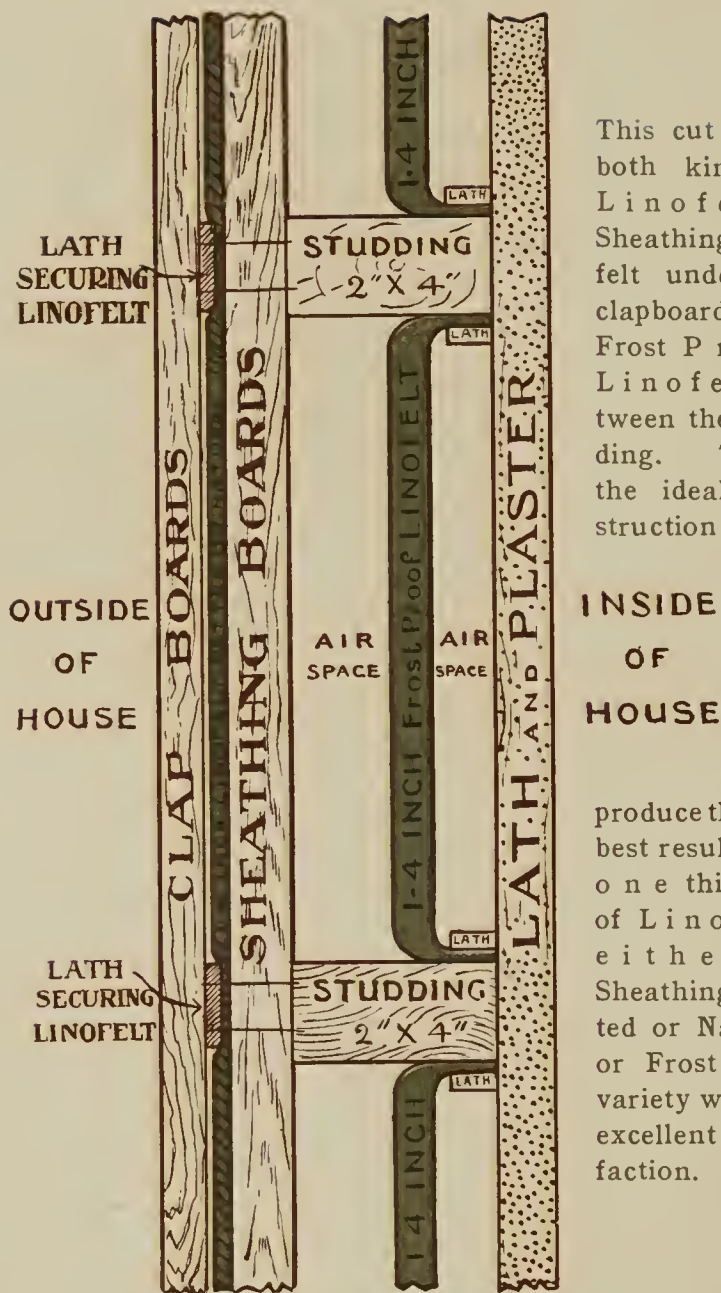
A horse kept in a warm stable will go through the winter in much better condition.

Linofelt should be applied in barns in the same way as we have previously described for residences, unless drop siding or single layer of sheathing lumber is used. In this case we would suggest that 1x4 strips be toe-nailed at 36-inch centers between the studding, before the siding is put on, and directly to the studding a layer of our Linofelt be applied; over the Linofelt and exactly on top of the studding, up and down, nail lath to secure the Linofelt. Then finish with drop siding or sheathing lumber.

If the barn is already built and you wish to make it warmer, you can use Frost Proof Linofelt between the studding in the manner described on page 12.

REFRIGERATORS, ICE HOUSES, CREAMERIES, ETC.

Many progressive farmers are building their own refrigerators, ice houses, creameries, etc. The Union Fibre Co. is the largest exclusive manufacturer of insulating materials for these purposes in the world. See last page. If interested, send for special booklet. Our materials prevent heat or cold from passing through walls.



This cut shows both kinds of Linofelt—Sheathing Linofelt under the clapboards and Frost Proof Linofelt between the studding. This is the ideal construction to

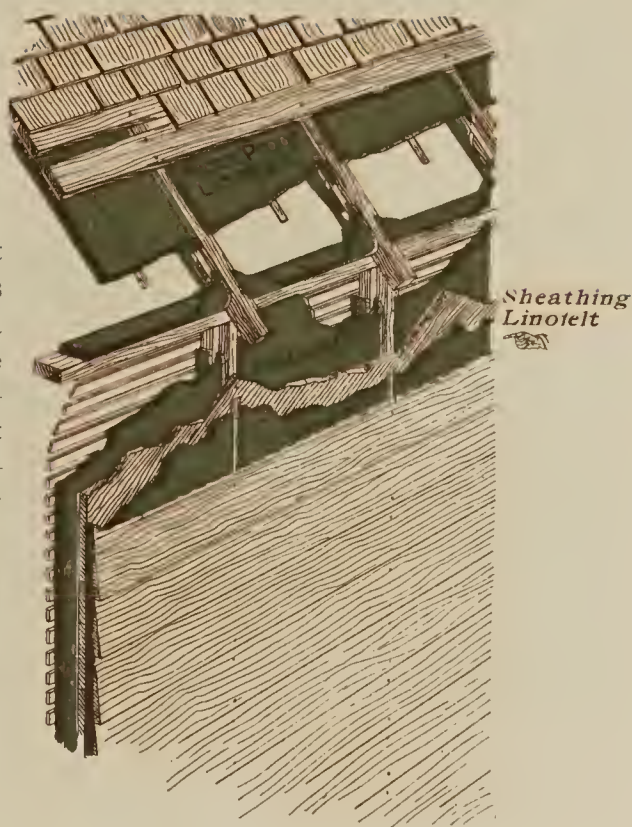
produce the very best results, but one thickness of Linofelt, either the Sheathing (Retted or Natural) or Frost Proof variety will give excellent satisfaction.

CROSS SECTION OF FRAME HOUSE

Showing method of using **LINOFELT**

Here is shown Frost Proof Linofelt between the studding fastened with a lath each side, and Retted or Natural Linofelt between the sheathing boards and clapboards, fastened with a lath directly over the studding. In places where winter is not very severe the sheathing boards may be left out of the construction, Linofelt attached directly to the studding with lath over it and the clapboards nailed through the lath to the studding. Sometimes you can save money on construction—always you can save money on fuel by using Linofelt.

The way Frost Proof Linofelt is applied under a roof and in the walls of a house—Sheathing Linofelt is also shown. — Note the lath over the studding.



BRICK & CONCRETE & HOLLOW-TILE HOUSES



If houses are built of brick, stone or concrete or hollow tile, their comfort can be greatly increased by the use of Linofelt in the following manner. 1x2 furring strips should be spiked to the walls at 36-inch centers. Over these strips place a layer of Linofelt, and fur again for the lath and plaster. This, as you see, leaves two air spaces and makes the wall warm and dry.

If 2x4 studding is used as in some constructions Frost Proof Linofelt can be run up and down between studding as shown on page 16.

This construction, even in coldest climates, will prevent frost or moisture on the inside wall surfaces.



ALEXANDER APARTMENTS, Winnipeg, Canada.
Architect, John D. Atchison.

SPECIAL GRADES OF LINOFEELT

ASBESTOS RETTED LINOFEELT

This grade is manufactured from degummed flax fibre a quarter of an inch thick stitched between two sheets of rosin sized paper and is covered on both sides with sheet asbestos, 36 inches wide, put up in rolls of 200 square feet, weight per roll 86 pounds. The asbestos sheet makes this material fire-proof. It is used for sheathing and sound deadening purposes. We can also furnish Natural Linofelt asbestos covered.

RETTED WATER-PROOF LINOFEELT

This is the same as Retted Linofelt except we use RED ROPE WATER-PROOF INSULATING paper instead of rosin sized sheathing paper. We especially recommend this grade for the better class of residences and other buildings where the owner is willing to pay a little more to get a better grade of paper.

FROST PROOF LINO FELT—WATERPROOF

Same as Frost Proof Linofelt except we use RED ROPE WATER-PROOF INSULATING paper instead of rosin sized sheathing paper. We especially recommend this grade for the better class of residences and other buildings where the owner is willing to pay a little more to get a better grade of paper. We also cover Frost Proof Linofelt with sheet ASBESTOS, making it fire-proof.

LINO FELT TAPE

This grade is manufactured from degummed flax fibre a quarter of an inch thick stitched between two sheets of rosin sized paper, six inches wide, put up in rolls of fifty lineal feet. Used around window and door casings to prevent draughts.

Regular Water-Proof Grades

These are for insulation of Cold Storages, Ice Houses, Refrigerators, etc.

ONE-HALF INCH LINO FELT

This grade is manufactured from degummed flax fibre one-half of an inch thick stitched between two sheets of three ply red rope insulating paper, 36 inches wide, put up in rolls of 120 square feet, weight per roll 55 pounds. It is used for the insulation of cold storage plants, ice boxes, creameries, etc. and is unsurpassed by anything of equal thickness as a non-conductor of heat and cold. See two last pages.

QUARTER-INCH LINO FELT

This grade is manufactured from degummed flax fibre a quarter of an inch thick stitched between two sheets of three ply red rope insulating paper, 36 inches wide, put up in rolls of 200 square feet, weight per roll 65 pounds. It is used for the same purposes as one-half inch Linofelt.

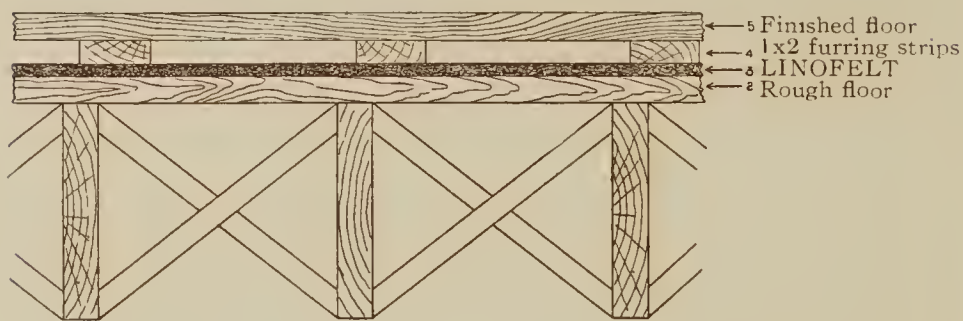
Many stationary ice boxes in homes have been built with quarter inch and half inch Linofelt as insulation. The Linofelt saves enough in one summer's use to pay for itself.



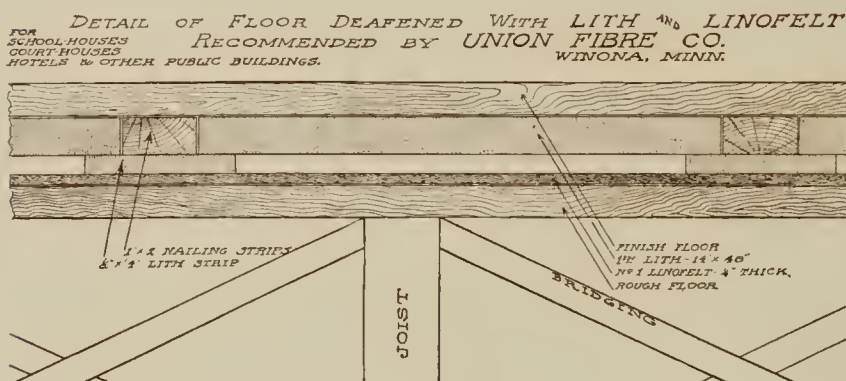
LINO FELT ADDS LESS THAN 1 PER CENT TO THE COST of your house when you are building, but MORE THAN 40 PER CENT TO ITS COMFORT AND VALUE when you are living therein.

LINO FELT TO DEADEN SOUND

Those who have lived in a house not effectively deafened, know of the many annoyances resulting from sounds traveling freely from cellar to garret, and can scarcely imagine the luxury of the thoroughly deafened house.



One method of application, Linofelt only.



Another method using Lith and Linofelt

In the first place have your false floor laid as tightly as possible. If your walls are hollow, have the false floor laid into the space and pack some Linofelt, or about three or four inches of mineral wool into the space before plaster-



ELM RIDGE CLUB HOUSE, Kansas City, Mo.
Contractor and Builder, Joseph H. Stone, Kansas City, Mo.

JOSEPH H. STONE
CONTRACTOR FOR BUILDINGS
442 AND 448 RIDGE BUILDING
HOME PHONE MAIN 8270

Kansas City, Mo., Aug. 2, 1907.

MR. J. Y. BEARD,

Union Fibre Co., City.

Dear Sir:—I have used your “Insulating Quilt” on several jobs and have found it to be very satisfactory and giving good results.

Yours very truly,
JOSEPH H. STONE.

ing. This is to avoid the possibility of communicating sound from one floor to another through the hollow wall.

In any case, wherever possible, have some deadening material inserted at the back of the base boards.

When laying your deadening, have all joints closed as tightly as possible.

If you have any folding doors, see that the space is deadened between the double walls as efficiently as the floor of the room. ALL partitions should also be deadened between the studding before they are plastered. If you cannot use a prepared deadener in these irregular places, you can always pack in a couple of inches of loose mineral wool.

REMEMBER THAT THE MAXIMUM EFFICIENCY OF A DEADENED FLOOR DOES NOT EXCEED ITS WEAKEST POINT. Therefore, if these details are not observed, the investment in deadening material is practically wasted.

If you have gas or other pipes on the floor, do not let your finished floor come in contact with them at any point. Always

cut away the finished floor and insert some deadening material between it and the pipes. When laying the carrying strips, see that they do not come in contact with the pipes at any point. If there are any upright pipes do not let the false floor come in contact with them; cut it away about half an inch and pack space with mineral wool. This will have a tendency to muffle the communication up and down the pipe.

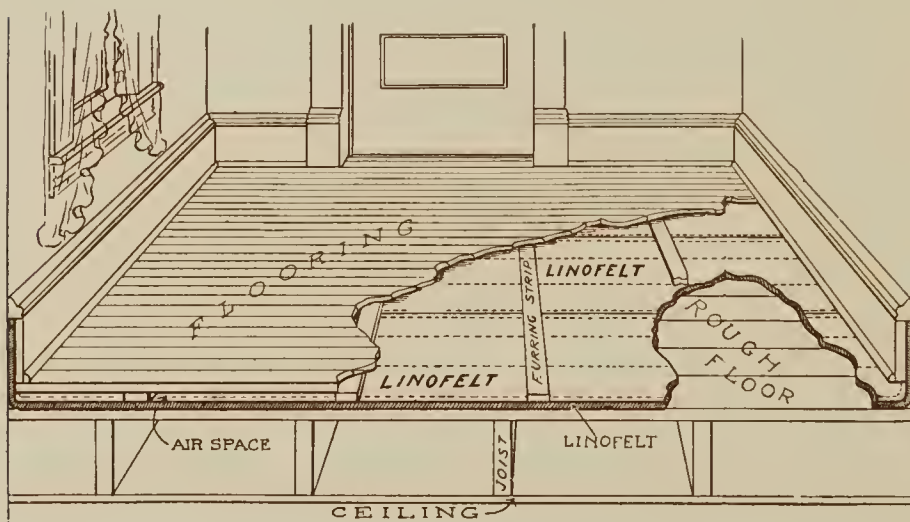
When laying the carrying strips, do not lay them directly over the joists, but to one side, if possible, (See illustration), and NAIL the strip through the deadening to the false floor. We know that it decreases the efficiency of a deadening material to nail through it, but one must offset this by great care everywhere as described above. It is impracticable to lay a floor without nailing the furring strips and those who advise it are not familiar with the best practice.

To Deaden Sound in a Partition

The usual method is as follows: Place studding at 16 inch centers, toe-nail 1 x 4 furring strips flush with face of studding, horizontally at 36 inch centers, measuring from the floor; then apply Linofelt laterally so that joints come directly over the furring strips, and secure the Linofelt to studding by means of common lath nailed perpendicularly over studding, after which lath and plaster is applied in the usual manner. To give better results the same construction should be used on the other side of the partition also.

This will give a very satisfactorily deadened partition, but a certain percentage of sound will still be transmitted by the nails and studding.

The only method of overcoming this objection is the following construction: Set studding at 8 inch centers staggered one and one-half inches; place 1 x 4 furring strips 14 inches long, toe-nailed horizontally, flush with face of studding at 36 inch centers from floor. These 14 inch furring strips will run continuously on each side of the partition, missing the staggered stud in the middle alternately. Then apply Linofelt in the manner above described. The same construction is used on the opposite side of the partition, care being taken that the Linofelt is secured in the same manner TO THE INTERMEDIATE STUDS which were missed on the other side, so that there is no continuous connection from one side of the partition to the other by means of studding and nails.



Notice that Linofelt should extend up under the baseboard, thus cutting the finished floor away from the walls.



WELLINGTON SCHOOL, Winnipeg, Canada.
Architect, J. B. Mitchell.

THEORIES OF HEAT AND SOUND

Linofelt is a house insulation.

To insulate (from the Latin) means to make an island of something. To insulate is to surround a body with a different sort of matter so that the body is cut off, like an island in the sea. To insulate from sound waves and heat waves is to interpose between the protected space and the outside a material which will refuse to conduct heat or noise. On a house covered with Linofelt heat waves and sound waves beat in vain. They cannot find admittance.

Why does Linofelt keep out Heat or keep out Cold?

Heat is a motion of the molecules (small particles) of the air, or of any substance. The heat waves of the sun, for example, act upon the wood of a house in such a way as to cause



NEW ENGLAND APARTMENT BUILDING, 1124-26 Paseo, Kansas City, Mo. Kendall Securities Co., Owners. Edwards & Sunderland, Architects.

the wood molecules to vibrate, to dance up and down (and all around.) When the molecules are very hot they vibrate violently and this motion is in turn transmitted to the air within the house, so that these air particles are agitated; the sensation of heat is then present to the occupants of the house.

All substances offer a more or less perfect obstruction to the passage of what we term heat, that is, all substances must have a great deal of work expended upon them in order that their molecules may be violently agitated. Some substances are much harder to agitate in this way than others. It is harder for example to stir the molecules of a piece of wood than those of a piece of iron. Wood, therefore, is relatively a poor conductor of heat and iron is a very good conductor because the heat, so to say, flows through it very readily. Flax fibres oppose a stronger resistance to this heat motion than any other known substance.

The best non-conductors are those which have a dissimilar molecular structure, that is to say, those substances one particle of which differs slightly from another particle, in other words, mixed substances.

LINOFELT is a substance of dissimilar molecular structure. It is made up of flax fibres and minute air spaces. The



NEWPORT APARTMENTS, 204-208, 17th St., Milwaukee.
J. and L. Wecheselberg, Owners. Architects, Hood & Tulgren.

diameter of a flax fibre is .0005 inch, and in the interior of the fibre there are hollow spaces containing air. In the fibre blanket, which is one quarter inch in thickness, there is an uncountable number of these fibres intertwined, holding in their embrasures minute air spaces, and in their hollow cells still more minute air spaces.

Heat applied to one side of this blanket must cause the tiny air bubbles and the fibre particles also, to vibrate in some sort of union before the molecules will transmit their motion to the next layer of fibre and air spaces. It is a matter of great difficulty to do this because of the great dissimilarity in the molecules of the fibre and in the particles of the air, which must be agitated together before the motion is transmitted. If each tiny air bubble dances to a certain tune, it must force the fibre particles of entirely different structure, which surround it, to dance also to the same tune; and, the different substances are unwilling partners. This motion must be repeated a thousand times as the heat wave proceeds from one infinitely thin layer of fibre and air spaces to the next. Thus the heat waves are dissipated and lost. Hence the heat within the house is retained therein, and unless the heat goes out the cold outside cannot come in.

PROTECTED FROM NOISE AND COLD BY LINOVELT
AND LITH.



ILESLEY APARTMENTS, 572 Marshall St., Milwaukee
Jas. K. Ilesley, Architect and Owner.

Why Linofelt Keeps Out Noises.



SOUND, like heat, is a mode of motion due to the elasticity of several mediums, principally the mixed gas which we call air. We will consider sound not as it is generally thought of, in its effect on us, but as the cause of this effect.

All sounds are transmitted to us by air. Our ears are but delicate machines which respond to the elastic impact of what is called a sound wave.

A sound wave is a sudden movement of a portion of the air which is twanged like a guitar string. When this motion strikes the sensitive portions of the ear we hear sound.

Whenever we perceive sound some body, either solid, liquid, or gas, is in vibration, and the air surrounding the vibrating body is also vibrating in unison with it and the drum and the bones of the ear are vibrating in unison with the sounding body and the air.

Now, when two persons are in different rooms separated by a wooden partition and the first shouts, the sudden twanging of his vocal cords causes the air in the room to vibrate. This vibration proceeds to the wooden partition, and the sound waves beat upon the partition, like the sea does upon the shore. The wooden partition at once beats in unison with the tones of the speaker, and then the air in the second



AGRICULTURAL COLLEGE, Winnipeg, Canada. Cost \$178,000.00.
Architect, Mr. Sam Hooper, Provincial Architect for Manitoba.

room is thrown into vibration by the resounding wood. The second person then hears the shout.

It is evident, therefore, that the transmission of sound requires the assistance of an elastic body which can be suddenly distorted, and will as suddenly tend to resume its original position.

If a feather-bed were suspended between the two wooden walls of the partition used in the example, and all other sources of sound were excluded, the conditions of transmitting sound would be altered. If one side of the wooden partition were made to vibrate, this vibration would be sent into the non-elastic mass of feathers; the feathers would be pushed in by the vibration of the wooden wall, but having no elasticity could not send the impulse onward. An elastic body, when pushed out of its original shape seeks to return to that shape, but the feathers being once pushed back by the vibrating board would lie inert without any tendency to move in either direction.

This, then, is the theory under which all sound deadening materials are made; that they must be of non-elastic substances so that when they receive on one side the impact of the sound wave they allow that impact to sink in, having no elasticity with which they can send it onward.

LINOFEELT is the best sound deadener because it has millions of infinitely fine non-elastic fibres in which the sound is cushioned but not transmitted.

PROTECTED FROM NOISE AND COLD BY LINO FELT
AND LITH.



MAPLES APARTMENT BUILDING, 10th and Lydia Ave., Kansas City, Mo.
G. W. Smith, Owner. Edwards & Sunderland, Architects.

A. B. ANDERSON,
ARCHITECT
ROOM 939 NEW YORK LIFE BLDG.
TELEPHONE 742 MAIN.

Kansas City, Mo., Aug. 1, 1907.

J. Y. BEARD,

Southwestern Agent, Union Fibre Co.,
571 Sheidley Bldg., Kansas City, Mo.

Dear Sir: In reply to your inquiry as to the merits of your Linofelt deadener used in the Mt. Washington School and the Hogland Flats at 9th and Paseo, wish to say that as far as I know, the goods have given perfect satisfaction. I have never had any complaint from the School Board in regard to the Mt. Washington School, and had there been any difficulty I certainly would have heard of it. I think your Linofelt deadener is all that you claim for it, and can heartily recommend same. You are at liberty to refer anybody you may wish to me for reference.

Yours very truly,

A. B. ANDERSON.

PROTECTED. FROM NOISE BY MINERAL WOOL SOUND
DEADENER



SCAMMON APARTMENTS, 810-814 Wells St., Milwaukee.
Owners, Gilman Estate. Architects, Lenhouts & Guthrie

UNION DEPOT COMPANY

E. J. Sanford, President and Supt.
L. S. Banks, Gen'l Ticket Agent.
F. A. Updegraff, Gen'l Baggage Agent

Kansas City, Mo., Aug. 2, 1907.

UNION FIBRE COMPANY,

571 Sheidley Building, Kansas City, Mo.

My dear Sirs: Some three years ago, I had occasion to investigate the floor-deadening material question. I was at that time erecting three flat buildings at the corner of 36th and Troost Avenue.

After considerable investigation, I decided to use Lino-felt, which has proven very successful, and I can cheerfully recommend the same to anyone looking for a deadener for floors in flats, &c.

Yours very truly,

L. S. BANKS.

PROTECTED FROM NOISE AND COLD BY LINO FELT



RESIDENCE OF GEO. H. RAMER, Winona, Minn.
Architect, A. E. Myhre, Winona. Builder, Fred Huseman.

A. M. RAMER COMPANY
151, 153, 155 EAST SECOND ST.

Winona, Minn., January 25, 1908.

Union Fibre Company.

Gentlemen:-- Winona, Minn.

I have used your sheathing Linofelt in the building of my residence, and this winter I find the house very comfortable with a small amount of coal.

From my experience and satisfaction I would not build any dwelling without protecting it with Linofelt.

Yours truly,

GEO. H. RAMER.

Linofelt is odorless and absolutely vermin proof. Bugs, rats, mice, or vermin of any kind will not touch flax fibre after it is treated by our degumming process. This renders it antiseptic and odorless under any conditions.

Ask us to send you a sample of Linofelt so you can see for yourself what it is like.

PROTECTED FROM NOISE AND COLD BY LINOFEELT
AND LITH.



GRANDMORA APARTMENTS, 13th and Grand Ave., Milwaukee.
Owner, Mr. Patrick Cudahy. Architect, H. J. Rotier.

PROTECTED FROM NOISE AND COLD BY LINOFEELT.



THE WARDLOW, Winnipeg, Canada. John D. Atchison, Architect

PROTECTED from NOISE by MINERAL WOOL SOUND DEADENER.



HOLLYWOOD APARTMENTS, 222-226, 9th St., Milwaukee, Wis.
Owners, Gilman Estate. Architects, Lunhouts & Guthrie.

If you use building paper you will lose 44 per cent more heat through your walls than if you use our Linofelt construction. This great loss of fuel would soon pay for the slight extra cost, to say nothing of the comfort Linofelt will give you, and the continued saving in after years.

These statements are based on scientific tests made by the Starr Engineering Company, 258 Broadway, New York City. We will gladly send a copy of this test upon request.

LINOFELT ADDS LESS THAN 1 PER CENT TO THE COST of your house when you are building, but MORE THAN 40 PER CENT TO ITS COMFORT AND VALUE when you are living therein.

MINERAL WOOL SOUND DEADENER

The Union Fibre Co. are also manufacturers of MINERAL WOOL SOUND DEADENER, which consists of a quilt one-half inch in thickness of rock fibre wool, stitched between two sheets of building paper or of asbestos paper, according to grade. The quilt has the additional merit of being unburnable besides possessing high efficiency as a non-conductor of heat (or cold) and sound. It is put up in rolls like Linofelt and is used in building operations like Linofelt.



The mineral or rock fibre wool from which the quilt is made is manufactured in our mill at Yorktown, Indiana, situated on a large deposit of silica-bearing limestone rock.

The rock wool is made under our patented processes. The rock is subjected, in furnaces, to a heat of 3,500 degrees F., at which point it liquifies and is blown by a secret and improved method into the cooling chambers. Here it resembles cotton in appearance and texture, having the following points of superiority over other mineral wool.

- (1) It contains no dust.
- (2) It is soft and pliable.
- (3) It is not prickly, nor harsh on the skin of those handling it.
- (4) Its settling propensity when packed in walls is reduced to a minimum.
- (5) It is indestructible and constant in chemical structure.

This rock wool has twelve times the bulk of the original rock, showing that it has imprisoned within itself more than eleven times its own bulk of air. Besides, the fibres

of the silicate themselves are high non-conductors of heat. This explains why mineral wool is such a good insulating material.

In addition, the softness and non-elasticity of the individual fibres make it one of the best non-conductors of sound.

Mineral wool in bulk is put up in bags of 50 lbs. each, and, being made from rock, is absolutely fireproof and makes an excellent filling in small places where Linofelt cannot be used.

L I T H

Lith is a non-conductor of sound, heat and cold, put up in the form of boards or slabs, manufactured from a combination of Rock Fibre Mineral Wool and Degummed Flax Fibre.

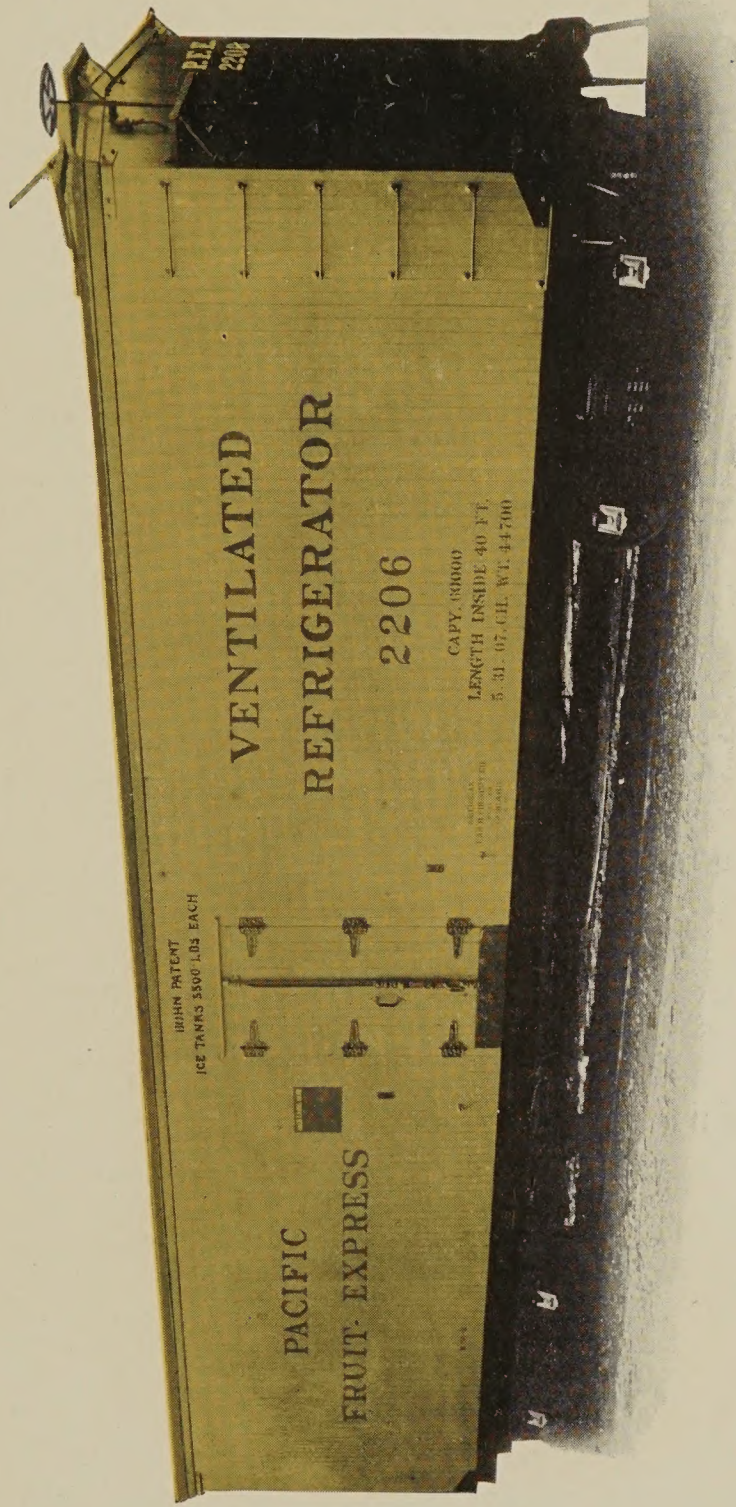
Our process of manufacture removes all the settling propensities of Mineral Wool, and strength is given the board by using degummed Flax Fibre. It is made into sections 14 inches, 16 inches, and 18 inches wide, and 48 inches long, regular thickness $\frac{1}{2}$ inch, 1 inch, 2 inches, 3 inches and 4 inches. The $\frac{1}{2}$ inch and 1 inch thicknesses are largely used for sound deadening of floors and the 1 inch, 2 inch, 3 inch and 4 inch for cold storage and refrigerator insulation.



Write for our booklet "Cold Truth," that tells you why Lith and Linofelt are the best insulation for cold storages, breweries and refrigerators of every kind

ONE OF 6,600 REFRIGERATOR CARS LINED WITH LINOVELT

Ordered at one time by the Harriman System



This refrigerator car is owned by the Harriman Railroad Lines, and is one of 6,600 lined with two layers of REFRIGERATOR LINOVELT. This is the largest order for insulation ever given, amounting to approximately 20,000,000 square feet of Linovelt.

The Harriman Railroads made scientific tests of every form of insulation on the market, and the award to Linovelt is a public acknowledgment in most practical form of Linovelt's superiority.

WHEREVER THE
PROBLEM IS

To Keep Out Heat
To Keep Out Cold
To Keep Out Sound
To Keep Out Moisture

IN ANY SORT OF
BUILDING OR STRUCTURE



This company makes non-conductors of heat, cold and sound for cold storages, refrigerator cars, ice boxes, breweries, ice plants and dwelling houses.

Flax Lith Insulation,

High efficiency and low cost.

Peerless Cork Boards

Impregnated Cork Boards---Fireproof Cork Boards

Linofelt

for refrigerators of every type.

Mineral Wool Sound Deadener

for public buildings and dwellings

Granulated Cork

Mineral Wool---Fire and Water-proof Paint and Cement.

The Union Fibre Co. is the largest exclusive insulation manufacturing concern in the world.

Write to our offices or to our factories
Main Office Winona, Minn.

Offices	General Sales Offices	Offices
500 Fifth Ave.,	1114 Great Northern Bldg.,	571 Scheidley Bldg.,
New York	Chicago, Ill.	Kansas City, Mo.

Factories---Winona, Minn., and Yorktown, Ind.

The
Union
Fibre
Company
should
be
invited
to
aid
in
the
problem's
solution.

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